UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
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NOTICE OF RELEASE OF PA-560, A ROOT-KNOT NEMATODE RESISTANT, YELLOW-FRUITED, HABANERO-TYPE PEPPER

The Agricultural Research Service, U.S. Department of Agriculture, announces the release of PA-560 pepper [Capsicum chinense Jacq.]. PA-560 is a yellow-fruited, Habanero-type advanced breeding line that is homozygous for a dominant gene conditioning a high level of resistance to the southern root-knot nematode [Meloidogyne incognita (Chitwood) Kofoid and White], the peanut root-knot nematode [M. arenaria (Neal) Chitwood], and the tropical root-knot nematode [M. javanica (Treub) Chitwood]. The release of PA-560 will provide pepper breeders interested in developing both open-pollinated and F1 hybrid cultivars access to a near-cultivar quality parental line that is homozygous for the root-knot nematode resistance gene. PA-560 was developed at the U.S. Vegetable Laboratory, Charleston, SC, by Dr. Richard L. Fery, Supervisory Research Geneticist, and Dr. Judy A. Thies, Research Plant Pathologist.

In 1995, recurrent backcross breeding procedures were initiated to transfer the dominant root-knot nematode resistance gene from a Scotch Bonnet accession into classical Habanero-type backgrounds. The donor parent was PA-426 and the recurrent parent was PA-350. PA-426 is a root-knot nematode resistant, Scotch Bonnet-type germplasm line that was released by the USDA in 1997. PA-350, susceptible to root-knot nematodes, is a classical, Habanero-type cultigen obtained from an heirloom collector. In 2002, a total of 63 BC4F3 populations were evaluated in a greenhouse test for reaction to M. incognita and in a replicated field test for horticultural characteristics. Although superior, root-knot nematode resistant, orange-fruited BC4F3 populations were identified in these 2002 tests, no resistant, yellow-fruited BC4F3 populations were found. However, one of the susceptible yellow-fruited BC4F3 populations (02-564) did exhibit superior horticultural characteristics, and a single plant from this population was subsequently crossed with a single plant from one of the resistant, orange-fruited BC4F3 populations (02-531) to initiate a pedigree breeding procedure to develop a root-knot nematode resistant, yellow-fruited, Habanero-type line. PA-560 was derived from a single F3 (BC4F3 x BC4F3) plant grown in 2005. Both of the parental lines used in the last cross are sister lines of the orange-fruited, root-knot nematode resistant cultivar TigerPaw-NR that was released by the USDA in 2006.

PA-560 has a compact plant habit (height = 83 cm; width = 103 cm) and produces campanulate-shaped (lantern-shaped), yellow-colored fruit. PA-560 fruit have a more elongate shape than those of 'TigerPaw-NR'. The period from transplanting to first harvest of mature fruit is 77 - 86 days at Charleston, SC. There are typically three pedicles per axil and the pedicle position at anthesis is intermediate. Flower petal color is white; the corolla

throat markings are yellow, and the stamens have white filaments and purple anthers. At full anthesis, the length of the style is the same or slightly greater than the length of the stamen. The leaves are large, lanceolate shaped, and have an intermediate green color. The stem pubescence is sparse and the leaves are glabrous. Fruit-bearing plants exhibit extensive anthocyanin pigmentation on the stems, branches, and petioles; there is moderate pigmentation at the base of the peduncles. The seedling hypocotyl exhibits heavy anthocyanin pigmentation. The fruits are attached to the pedicel in a pendant manner (typically two fruit per cluster); the calyx is saucer-shaped (flat, does not envelop the fruit base); the calyx margin shape is dentate; the annular constriction at the junction of the calyx and peduncle is present; and the pedicels are short, curved, and slender. The fruits are non-deciduous, i.e., the pedicle and calyx usually remain on the fruit at harvest.

The results of two replicated field studies conducted at Charleston, SC, indicate the yield potential of PA-560 is comparable to that of traditional Habanero-type cultigens. In a 2006 field test, no difference in marketable fruit yield could be demonstrated between PA-560 and the recurrent Habanero-type parent PA-350 (PA-560: 17,313 kg/ha; PA-350, 17,313 kg/ha). In a 2007 field test, no difference in marketable fruit yield could be demonstrated between PA-560 and the commercial cultivar Hababero (PA-560: 6,409 kg/ha; Habanero: 6,929 kg/ha).

A typical lantern-shaped PA-560 fruit weighs about 7.6 - 8.0 g and is 2.37 – 2.49 cm wide x 4.43 – 5.54 cm long. The shape of the peduncle attachment end of the fruit is truncate, the neck at the base of the fruit is absent, and the shape at the blossom end of the fruit is pointed. The cross-section of a typical fruit at the level of the placenta exhibits a slightly corrugated shape; the longitudinal cross-section exhibits a narrow triangular to trapezoid shape. The fruit wall is thin (1.43 – 1.60 mm). The color of immature fruit is a glossy, dark green; the color of harvest-stage fruits is a glossy, bright yellow. The fruits are extremely pungent (326,710 Scoville heat units), and a typical fruit has three locules (average number of locules: 3.3).

PA-560 is homozygous for a dominant gene that conditions a high level of resistance to root-knot nematodes. It has exhibited a high level of resistance to the southern root-knot nematode in all greenhouse tests; the numbers of galls and egg masses on the roots have always been minimal. The resistance exhibited by PA-560 is equal to that exhibited by the donor of the resistance gene, the Scotch Bonnet-type germplasm line PA-426.

The root-knot nematode resistant PA-560 is recommended for use as a parental line by pepper breeders interested in developing yellow-fruited, root-knot nematode resistant cultivars of Habanero-type peppers. The dominant nature of the gene conditioning the root-knot nematode resistance trait would make PA-560 useful as an inbred parent for development of root-knot nematode resistant F1 hybrids.

Small trial samples of PA-559 breeder's seed are available for distribution to all interested research personnel. Address all requests for seed to Dr. Richard L. Fery, U.S. Vegetable Laboratory, 2700 Savannah Highway, Charleston, SC 29414-5334. Genetic material of this

release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including the development and commercialization of new cultivars. It is requested that appropriate recognition of source be given when this germplasm contributes to research or development of a new breeding line or cultivar.

Signature:

K Simmon

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Deputy Administrator, Crop Production and Protection
Agricultural Research Service, U.S. Department of Agriculture

Date